

## PATENT COOPERATION TREATY



## PCT

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P-2002-018WO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/DK 03/00528	International filing date (day/month/year) 07.08.2003	Priority date (day/month/year) 02.09.2002
International Patent Classification (IPC) or both national classification and IPC H04R25/00		
Applicant OTICON AS		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"><li>I <input checked="" type="checkbox"/> Basis of the opinion</li><li>II <input type="checkbox"/> Priority</li><li>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li><li>IV <input type="checkbox"/> Lack of unity of invention</li><li>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li><li>VI <input type="checkbox"/> Certain documents cited</li><li>VII <input type="checkbox"/> Certain defects in the international application</li><li>VIII <input type="checkbox"/> Certain observations on the international application</li></ul>		
Date of submission of the demand  05.02.2004	Date of completion of this report  29.12.2004	
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Meiser, J  Telephone No. +49 89 2399-7966  	

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/DK 03/00528

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

### Description, Pages

1-8 as originally filed

### Claims, Numbers

1-8 as originally filed

### Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
  - ☐ the language of publication of the international application (under Rule 48.3(b)).
  - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:
- ☐ contained in the international application in written form.
  - ☐ filed together with the international application in computer readable form.
  - ☐ furnished subsequently to this Authority in written form.
  - ☐ furnished subsequently to this Authority in computer readable form.
  - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
  - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/DK 03/00528**

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-8
	No: Claims	
Inventive step (IS)	Yes: Claims	1-8
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-8
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Reference is made to the following documents:**

- D1: WO 02/17838 A (PETTERSEN ODD KR OE ;SINTEF TELE OG DATA (NO); SVEAN JARLE (NO); O) 7 March 2002 (2002-03-07)
- D2: US-A-5 201 006 (WEINRICH SOREN) 6 April 1993 (1993-04-06)
- D3: US-A-5 577 511 (KILLION MEAD C) 26 November 1996 (1996-11-26)
- D4: US-A-4 985 925 (CARUSO F GERALD ET AL) 15 January 1991 (1991-01-15)

The document D4 was cited in the description by the applicant.

**2. Claim 1**

The application relates to a method for counteracting the occlusion effect of an electronic device comprising

- an external microphone or input line,
- a signal processor and a receiver which receives a processed signal from the signal processor and delivers sound signals to the ear, whereby an ear piece is inserted into the ear canal and totally or partially blocks the canal whereby the sound conditions in the cavity between the ear piece and the tympanic membrane are directly or indirectly determined, and whenever conditions leading to occlusion problems are determined, the transmission characteristic of the transmission path to the receiver counteracts the occlusion effect.

The closest prior art is represented by D1.

The following features of **claim 1** are known from D1:

A hearing protector with communications terminal comprising

- an external microphone (cf. "M1" in fig. 1) or input line,
- a signal processor (cf. item "11" in fig. 1) and a receiver (item "M2" in fig. 1) which receives a processed signal from the signal processor and delivers sound signals to the ear, whereby an ear piece (items "1" and "2" in fig. 1) is inserted into the ear canal and totally or partially blocks the canal whereby the sound conditions in the cavity between the ear piece and the tympanic membrane are directly or

indirectly determined.

**D1** describes a hearing protector with an communications module whereby the noise attenuation is automatically adapted to the noise conditions and communication modes. In addition, **D1** uses a thin duct (cf. items "T3" and "T4" in fig. 1) and a safety valve (item "V" in fig. 1) to counteract the occlusion effect (cf. **D1** on page 8, lines 19-25 and page 9, lines 30-36).

The method of independent **claim 1** differs therefrom in that claim 1 comprises inter alia the step of

- whenever conditions leading to occlusion problems are determined, the transmission characteristic of the transmission path to the receiver counteracts the occlusion effect.

The problem to be solved by the present invention may therefore be regarded as how to provide a method for counteracting the occlusion effect of an electronic device delivering an audio signal to the ear whenever the conditions leading to an occlusion effect are present.

None of the cited documents hint at tracking the sound conditions in the cavity of the occluded ear and whenever conditions leading to occlusion problems are determined, the transmission characteristic of the transmission path to the receiver counteracts the occlusion effect.

In particular, **D2** describes a hearing aid with feedback compensation in order to prevent "howling" of unwanted feedback by means of a primary and a secondary microphone, a difference amplifier and a receiver. The problem of occlusion is not mentioned in **D2**.

**D3** describes an instrument for measuring the degree of occlusion of an occluded object such as an earmold, in the ear canal including an external and an internal microphone, logarithmic amplifiers and a DC meter.

**D4** describes an electronic earplug which combines active and passive noise reduction, a bilateral transducer drive and a shunt feedback control correction network. The Active Noise Reduction (ANR) feedback loop is an acoustical means of active reduction of ambient noise which penetrates a passive plug barrier. Any component of an internal summing microphone signal which differs from the

desired signal is attenuated by negative feedback. The ANR feedback changes the acoustical impedance of the occlusion at the eardrum and so removes the feeling of the stuffed ear. D4 mentions that the summing microphone can be used to monitor the sound pressure level (SPL) at the eardrum in order to reinsert the earplug when the SPL is increased above a specified level (cf. column 3, lines 58-63) but not in order to counteract the occlusion effect.

Therefore, the subject-matter of **claim 1** meets the requirements of Articles 33(2) and 33(3) PCT concerning novelty and inventive step.

**3. Claims 2-8** are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step (Art. 33(2) and 33(3) PCT).

**4. Remarks concerning lack of clarity of the claims, Art. 6 PCT:**

**4.1** Independent **claim 1** does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved (cf. claim 1 on page 9, lines 10-14 "whereby the sound conditions in the cavity between the ear piece and the tympanic membrane are directly or indirectly determined, and whenever conditions leading to occlusion problems are determined, the transmission characteristic of the transmission path to the receiver counteracts the occlusion effect."), which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

**4.2** Dependent **claim 8**, which is dependent to any of claims 1 and 2, refers to "the detection of own voice activity", which is only defined in claim 2.  
Therefore claim 8 should have been made dependent on claim 2 only.